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| 09/656,092 | 09/06/2000 | Joseph Nathan Mitchell | 090936.0443 | 8849 |

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EXAMINER

KNAUSS, SCOTT A

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 05/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/656,092

Applicant(s)

MITCHELL ET AL.

Examiner

Scott A Knauss

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-9,17,20-24 and 31-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,8,9,17,21,24 and 31-42 is/are rejected.
- 7) ☒ Claim(s) 4,6,7,20,22 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. In response to the applicant's amendment received on 4/24/02, all requested changes to the claims have been entered.

The previous rejection, therefore, has been withdrawn, and the following new rejection is applied.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1,5,8,9,17,21,24,31-37 and 39-42 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,360,036 to Couillard.

5. Regarding claims 1 and 17 Couillard discloses in figures 1 and 2 a system for directing light beams comprising arrays of stationary fiber optical waveguides (column 2,line 3), each waveguide being constructed to conduct one of a plurality of light beams including a selected light beam.

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Couillard additionally discloses a thermal actuator in fig. 30 including:

A single actuator associated with a reflective element (#32);

Each thermal actuator comprising a cantilevered arm (#40) having a fixed end attached to a substrate and a free end to which the reflective surface is attached, the arm being made from a material having a thermal expansion property.

The arm having a top surface and a bottom surface with a layer of material (#46) having a different thermal expansion property (column 5, lines 43-45) on the top surface, and

A reflective surface attached such that it is substantially perpendicular to the substrate.

Regarding claims 5 and 21 Couillard disclose that the arm is fabricated from a wafer of single crystal silicon (column 4, lines 26-27).

Regarding claims 8 and 24 Couillard discloses the use of a conductive layer of metallic material (#66) (column 6, lines 59-60);

Regarding claim 9 Couillard discloses an arm which is spaced from the substrate by an extension of the arm extending substantially vertically from the substrate (see fig. 3).

Regarding claims 31 and 33 Couillard discloses in figs. 4 and 6 using the application of electrical or heat energy to move a reflective surface into the path of a selected light beam.

Regarding claim 32 and 34 Couillard discloses a reflective surface rigidly attached to the arm.

Regarding claim 35 Couillard discloses in figures 1, 3 and 30 a thermally operated optical switch with all the limitations set forth in the claim including:

A substrate (#22);

An array of reflective surfaces, each reflective surface having a single associated actuator (see fig. 1);

Each actuator having a pair of arms (fig. 30, #44,#40), each arm of the pair having a fixed end affixed to the substrate and having free end to which an associated reflective surface is attached.

Regarding claims 36 and 37 Couillard discloses arms having different widths and lengths in fig. 30

Regarding claim 39 Couillard discloses reflective surface attached such that it is substantially perpendicular to the substrate.

Regarding claim 40 Couillard disclose that arm (#40) is fabricated from a wafer of single crystal silicon (column 4, lines 26-27), and arm (#44) may be made from silicon dioxide (column 5, lines 35-38)

Regarding claim 41 Couillard discloses an arm which is spaced from the substrate by an extension of the arm extending substantially vertically from the substrate (see fig. 30).

Regarding claim 42, since the two arms are made from different materials they would inherently possess different thermal expansion properties.

Claim Rejections - 35 USC § 103

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6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Couillard in view of U.S. Patent No. 6,366,414 to Aksyuk et al.

Regarding claim 38 Couillard discloses an optical switch with all the limitations set forth in the claim regarding claim 35 as stated above but does disclose attaching a reflective surface to two arms such that it is parallel to the substrate.

Aksyuk, on the other hand, discloses a mirror (#17) held by a pair of beams (#21,#19) such that it is parallel to a substrate (#13) for the purpose of modifying or reflecting an optical signal (column 1, lines 10-20).

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Therefore it would have been obvious to one of ordinary skill in the art to modify the optical switch of Couillard by attaching a reflective surface to two arms such that it is parallel to a substrate for the purpose of deflecting an optical signal in an optical switch.

Allowable Subject Matter

9. Claims 4,6,7,20,22 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 4 and 20, prior art fails to disclose a cantilevered thermally actuated switch having an air gap within an arm.

Regarding claims 6,7,22 and 23 prior art fails to disclose a cantilevered thermally actuated switch having layers on each of the top and bottom surface of an arm.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,903,380 to Motamedi et al. discloses another thermo-optic switch having a reflective surface.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

12. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A Knauss whose telephone number is (703) 305-5043. The examiner can normally be reached on 9-6 Monday-Friday.

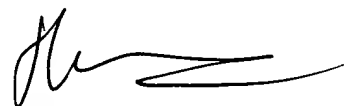
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (703) 308 - 4819. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9317 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Scott Knauss

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sak
May 23, 2002



SCOTT A. KNAUSS
Examiner